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Application of ICT as Teaching Tool in Electrical Installation in Nigerian TVET Institutions

Rasid Bin Abdurazaq Bala Hussaini
Faculty of technical and vocational education, University Tun Hussein onn Malaysia

Abstract

As information and communication technologies get its way into the educational environment, it may be difficult for the teaching and learning activities especially in TVET institutions to remain unchallenged. This study focuses on the application of ICT as teaching tool in electrical installation in Nigerian TVET institutions to prepare teachers capable to use ICT in TVET institutions. This study selects 10 participants and used descriptive method to investigate current status of the five TVET institutions in Jigawa state which was selected randomly to be the sample of this study. Semi-structured interview was conducted as primary source of data collection method. At data analysis stage, a thematic analysis as inductive method was used to analyze the data. Summary of the findings of the study: ICT Infrastructure at the TVET institutions: Colleges need more accurate more reliable equipment (computers, interactive white boards, digital cameras, digital video cameras, video conferencing systems and virtual learning systems. Internet access is not available for student teacher at two institutions out of five-the sample. The syllabuses are not up to date; most of the students can't use the Technological devises confidently. The instructional aspect is almost absent in the syllabuses. Teachers' trainers need training courses in technological and instructional aspects. Teachers' trainers don't have educational, technological and financial support. This paper identifies some of the challenges affecting ICT integration as teaching tool and make recommendations on how to promote ICT usage in teaching of electrical installation in TVET schools.
Keywords: Application of ICT; Teaching tool; Electrical installation; TVET in Nigeria.

1. Introduction

The governments of various nations, non-governmental organizations and academic institutions around the world have made significant investments in computer-based information technology to support teaching and learning process (Ntirandekura, 2017). Such investments made is toward enhancing the quality of education and learning that in turn gives the student a better chance to participate in the 21st Century learning environment. Information and communication technologies (ICTs) are valuable tools for achieving excellence in the teaching and learning process (Olatokun, 2009). ICTs include computers, LCD projectors software's and the internet among others. (Ololube, 2006)believed that such facilities were the most significant tools in the teaching and student learning.

Considering a tremendous effort by the federal government of Nigeria towards the successful use of ICTs in the teaching and learning, the government formulated several policies with lofty goals. Among other policy objectives were to encourage teachers to develop a sense of rapport with computer to solve teaching and learning challenges. Major impediments revealed were lack of computers and lack of knowledge among teachers. Nigeria is not committed to ICT integration in education Adeosun (2010); among others challenges were lack of skilled teachers, ICT tools, and other infrastructures. Other impediments include lack of poor organization and access to resources; poor quality hardware, inappropriate software and unreliability of electricity.

Also, according to Richardson (2012) challenges toward successful ICT integration in higher institutions of learning are the high cost of internet bandwidth, and lack of technical ICT expertise. Considering Nigerian TVET programme as important section of Nigerian education system, the sector is also facing such highlighted challenges. Indeed, the existing literature revealed that Nigerian small and medium sized enterprises (SMEs) as part of TVET programme also faced some challenges hindering its ICT integration.

Despite the significant role played by SMEs toward sustaining domestic and regional economic growth, among other factors that hinders the successful ICT integration to SMEs in Nigeria include corruption, lack of ICT facilities, cost of implementation, lack of funds, lack of awareness, lack of skills and training, lack of government policies that support ICT adoption in SMEs; electricity constraints among others (Apulu and Latham, 2009).

The purpose of this study is to find out how ICT is being used as teaching tool in teaching of electrical installation, and factors which hinder the take-up of ICT in classrooms. It also examined the benefits perceived by teachers in their uptake of a wide range of ICT including portable ICT devices, school networks, web-based resources and common office applications such as spreadsheets, word processing and databases. Hence, the need to explore and understand in details how ICTs stimuli teacher's instruction in the teaching of electrical installation courses.

2. Literature Review

The world event in the 21st century has turned to information and communication technologies, the world will continue to move further whether nations across the world embrace its use or not (Blewitt, 2010). In this regard, quite a good number of developed and developing countries around the globe believe that ICTs will continue to be a critical facilitator of effective teaching and student learning (Hennessy *et al.*, 2010). As such, the established academic institutions struggle to keep up with the new changes (Ntirandekura, 2017).

Nigerian government has developed specific ICT-related policies with lofty goals in 2001, the formulated policies focus on the country education system that includes TVET institutions so that they could effectively utilize ICTs (Adeosun, 2010). Technical and vocational institutions are the ones responsible for producing technologist and technicians in several disciplines Buabeng-Andoh (2012); such training includes electrical engineering as a course of study. ICT skills in TVET institutions are necessary especially to such systems that produce educators in technical education with instructional skills, technicians, and technologists (Ololube, 2006). Nonetheless, Nigerian TVET system has been criticized for the institutions lagging behind in the use of ICTs as teaching tool.

Thus, it is correct to state that the significant effort by the federal government of Nigeria toward the successful use of ICT in Nigerian TVET institutions was in vein. Perhaps, it is evident that the acquisition of ICT knowledge, skills regarding its use as a teaching tool remains the future ambition of many Nigerian TVET teachers. In this regard, it is important to provide Nigerian TVET teachers with information that will serve as additional support and awareness for improving their professional practices particularly in the field of electrical engineering discipline. Such information will benefit not only teachers but also the school management and in turn, the community as well. In this vein, this study was initiated to focus on issues revolving around ICTs and its application as teaching tool in electrical installation courses.

3. Methodology

This study adopted the interpretive qualitative research design which is premised on applied or action research to investigate the existing problem for the purpose of solving this particular problem through qualitative means of enquiry. However, the study also collected data from TVET institutions by making in-depth non standardized interviews to have an excellent descriptive result that can be derived about sample.

The study used snowball method to conduct a purposive sampling in three TVET institutions of Jigawa state polytechnic to collect appropriate data on a special population of such institutions that helps this study to generate information from a few members who are in different locations as targeted population and the result was analyze by using thematic and content analysis to generate theory on reasons for direct involvement of the interviewer and interviewee where findings and discussions has been authenticated as follows:

4. Findings and Discussions

Like any other developing countries, Nigeria has become aware of the important role of ICT in promotion all round development, especially in the education industry. In worldwide assessment of ICT integration in education, a number of factors militating against ICT integration in education where identified. Findings from Ololube (2006) revealed that major impediments were lack of computers, lack of knowledge among teachers, lack of skilled teachers, ICT tools and other infrastructures. However, from interview shows that weaknesses of ICT integration in TVET institutions includes lack of poor organization and access to resources; poor quality hardware, inappropriate software and unreliability of electricity. In addition, Richardson (2012) further stated that, the challenges toward successful ICT integration in higher institutions of learning include the high cost of internet bandwidth, and lack of technical ICT expertise.

In concordance with Richardson (2012) findings, Apulu and Latham (2009) suggested that the significant aspect to Consider in Nigerian TVET programme as important section indeed, the existing challenge are part from aforementioned problems highlighted above, others to include: corruption, lack of ICT facilities, cost of implementation, lack of funds, lack of awareness, lack of skills and training, lack of government policies that support ICT adoption in SMEs; electricity constraints among others.

However, similar discussion was held from previous findings on National Policy of Education (2004) that clearly stated in the country about the aim of technical and vocational education is to provide training on manpower in technology applied science, and commerce. It also gives training and imports the necessary skills to craftsmen technicians and other skills personnel who will be self-reliant. As such, Nigerian students enter the vocational education track at the end of junior secondary school, which corresponds to 9 - 12 years; all in an attempt to expose young individuals to pre-employment skills (Oketch, 2007).

Moreover, the National Board of Technical Education was established in 1977 to train middle-level manpower in technical education skills for the present world of work and national development. The NBTEs mandate is to regulate standards in academic programmes, and curriculum development, accreditation of the NCE technical programmes among others but to no avail.

TVET is continuously subject to the forces driving change in our institutions, and society as a whole. The use of information and communication technologies in education and TVET programmes in particular might be beneficial to students and the nation at large. Through the use of ICTs, learners will be opportune to have access to libraries and databases around the globe and subscribe to several electronic journals, and newsletter among others.

4.1. Information and Communication Technologies (Icts)

Information and Communication Technologies includes any communication device or application such as network, hardware, software, radio, cellular phones, television, computer and, satellite systems (Oviawe and Oshio, 2011). However, in this study, ICTS are restricted to Computers, LCD projectors, simulation software's, MS Excel and the Internet. According to Bertot *et al.* (2010), the essential and the most influential ICTs facilities include computers, LCD projectors, software, and the internet. Thus, all such tool needs to be fully utilized to engage the student.

4.2. ICT and Education

As we are moving further into the second part of 21stcentury, the established academic institutions struggle to keep up with the different challenges as a result of new technologies (Ntirandekura, 2017). Hence, there is need for students to learn how to seek out new information to meet up with the challenges of the dynamic environment. These technologies have marked the potential for knowledge distribution (Baskin and Williams, 2006).

As instructional content knowledge differs from one subject to another, the choice and use of ICT resources will differ regarding educational practices for the different concepts. However, teacher's beliefs, attitudes and their confidence with ICT remain relevant in the instructional adoption of ICT (Buabeng-Andoh, 2012). Teacher's use of ICT in the teaching process depends on the organizational contexts in which they live. There is a need for educational reasoning that provides teachers opportunities to make connections with their schools through constant access to ICT infrastructure. While, on the other hand, Barakabitze (2014) stated that students perceptions change when they are exposed persistently to the capabilities of ICT.

4.3. Nigeria's Vision for Integrating ICT In Schools

In preparation for the integration of information and communication technology in Nigerian schools, the federal government of Nigeria has developed National Policy on ICT integration vision and mission, to encourage teachers to develop a relationship with computer as stressed by Adeosun (2010). The objective of the policy is to:
   a. To facilitate the teaching and learning processes.
   b. To enhance the various teaching/learning approaches required to meet the needs of the   population
   c. To foster research and development.
   d. To widen access to education, range of instructional options and opportunities for any-   where,   any-time, any-place and any-path learning.

However, it is evident that the 2010 policy as highlighted above are geared toward successful teaching and learning to induce various teaching and researchers were yet to be realized in Nigerian education system (Adeosun, 2010).

4.4. Nigerian TVET Institutions

Technical and Vocational Education and Training refers to a range of learning experiences that are relevant to the world of work (UNESCO, 2014). Technical and vocational education cuts across educational levels of post- primary, secondary, tertiary, non-formal and also informal or traditional apprenticeship sectors. Nigeria as a country of its own has five types of TVET institutions across the country outside the universities.

The integration of ICTs into TVET delivery is a valuable tool for enhancing its quality (Hollander and Mar, 2009). Accordingly, to achieve a successful integration of information and communication technology into the mainstream of TVET programmes, National board for technical education has introduced short-term course training workshop for capacity building to sensitize Polytechnic and mono-technic teachers in 2008. Furthermore, the most recent effort by NBTE was developments in curriculum, which they involved the use of ICT as a teaching tool in all TVET programmes.

4.5. Impacts of ICTs On Teachers and Students

According to Thomas *et al.* (2013) a teacher can build knowledge by investigating reality; in fact, ICT has provided both staff and their students with opportunities to develop new learning experience and opportunities.
   ▪ ICT help learners clarify difficult concepts motivate both teachers and their students.
   ▪ ICT saves both teachers and student time, make students active, and simplify teachers work (Laurillard, 2013).
   ▪ ICTs are used as teaching tool; students are actively engaged in the learning process through simulation and discussion.
   ▪ Those schools having greater ICT infrastructure perform more highly than those schools with less developed ICT infrastructure.

4.6. Impact of ICT Integration in Nigerian TVET Institutions

The impact of TVET in decreasing the danger of unemployment and reduction of poverty, these make it one of the fields of study that requires full deployment of ICTs. According to Bappa-Aliyu (2012), TVET programmes needs ICTs because of the present era where the world of work is rapidly changing its requirement for workers from skill based to ICT capable.

- ICT integration into TVET programmes eases the expansion and reinforcement by enhancing networking and knowledge sharing opportunities.
- ICTs promote equity in TVET programmes by providing educational opportunities to a greater number of citizens of all ages as well as those in rural and remote areas.
- The introduction of ICT to TVET delivery and assessment is an important tool for enhancing access and quality in TVET programme (Idris, 2010).
- If ICT is utilized properly in technical and vocational education programmes, it will undoubtedly improve the excellence of education and training in several e.g. increasing learner's motivation and engagement, making them life-long learners, facilitating acquisition of basic skills and enhancing teacher training (Idris, 2010).

5. Conclusion

The conclusions of this study are based on the findings presented in literature. The finding of the study sample is generalized to the whole population (the TVET institutions in Jigawa state). This study presents data and information that will enable the policymakers to make judgments on the current situation regarding the ICT integration as teaching tool and will help them to take new steps to utilize ICT in teachers' pre-service training and the future integration of ICT in secondary education.

It is hoped that the benefits from the use of ICT in electrical installations teaching are realized and optimized in schools. From the findings of the study, it would appear that future training should be designed to increase teachers' familiarity with a wider range of ICT applications, and teachers' be encouraged to reflect on, and make decisions about their own ICT development needs on ongoing basis.

Recommendations

In response to the above findings and to promote the level of ICT usage at school, it is recommended that government should consider the following:

- Classrooms well-equipped with ICT facilities like laptop, LCD, internet access and local area networks.
- Wireless Internet access at school so that teachers can find information besides books.
- Centralized database available to all. ICT network for teachers to share materials on the internet, and to post important announcement; events and results.
- Provide more teaching materials to teachers, e.g. PowerPoint to replace textbook/ hand notes.
- Organize more courses and seminars will help to change the mindset of the teachers by exposing them to current development in the ICT field.

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